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TITLE: Video preprocessing method
and apparatus with selective
filtering based on motion
detection

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INVENTOR-INFORMATION:

NAME	STATE	ZIP CODE	COUNTRY	CITY
Zhang; Ji	CA	N/A	N/A	San Jose
Gouliardon; Cedric	N/A	N/A	FR	Paris

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ABSTRACT:

Video preprocessing methods and apparatus which utilize motion detection to control selective filtering of pels in a sequence of video frames wherein a video preprocessor generates first and second motion metrics for a given pel in a current frame N by taking the difference between the given pel and corresponding pels in a previous frame N-1 and a subsequent frame N+1, respectively. The motion metrics are converted to

first and second bitmaps by thresholding the motion metric value against a first threshold. A motion detection metric is then generated for a given pel by summing the values of the first and second bitmaps for a group of pels which includes the given pel, and comparing the result to a predetermined threshold. The group of pels may include five pels on each of two lines above the given pel, and five pels on each of two lines below a given pel. The motion detection metric may be used to determine whether or not temporal median filtering and/or temporal lowpass filtering operations should be applied to the given pel. The motion detection metric may also be used in conjunction with an edge detection metric and a frame-wise motion activity measure to generate an address into a look-up table. The look-up table specifies a set of filter coefficients for use in a spatial lowpass filtering operation applied to the given pel.

37 Claims, 8 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 4

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Detailed Description Text - DETX (34):

In an exemplary embodiment, the filter selection process may be based in part on a moving average of the post-compression statistics. A number of

different techniques may be used to provide the moving average. Each of these techniques may also utilize a frame type (I/P/B) indication to account for frame type related differences in the post-compression statistics. One possible technique involves providing the moving average of the sum of mquants on a frame by frame basis, in which the average value is defined by a sliding average window which may be about 10 to 20 frames in size. An increase in the average value of mquant may indicate that the video image is becoming more blocky and that more filtering should therefore be applied. Another technique involves providing the moving average of the sum of the absolute values of the motion vectors. An increase in this moving average indicates a higher motion content in the video, such that more filtering could be applied without visual degradation. Another exemplary technique involves providing the moving average of the number of bits per compressed frame. An increase in this moving average indicates that the video is becoming more difficult to compress. These and other measures of post-compression statistics could be used in the filter selection process in accordance with the invention.